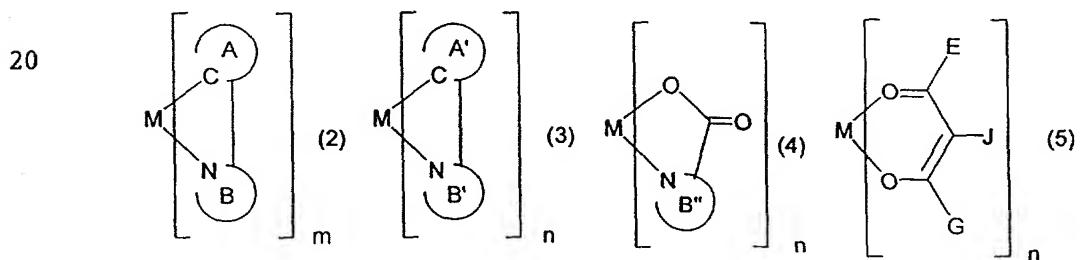


CLAIMS

1. An organic luminescence device, comprising: a pair of electrodes each disposed on a substrate, and at least one luminescence layer comprising an organic compound disposed between the electrodes; wherein the luminescence layer comprises a non-luminescent first organic compound and a phosphorescent second organic compound represented by formula (1) shown below, and the second organic compound is present at a concentration of at least 8 wt. % in the luminescence layer:

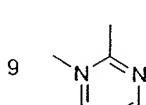
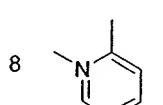
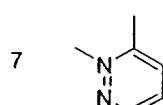
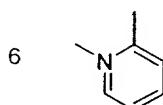


wherein M is a metal atom of Ir, Pt, Rh or Pd; L and L' are mutually different bidentate ligands; m is 1, 2 or 3; n is 0, 1 or 2 with the proviso that m+n is 2 or 3; a partial structure  $ML_m$  is represented by formula (2) shown below and a partial structure  $ML'_n$  is represented by formula (3), (4) or (5) shown below:

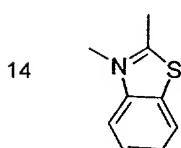
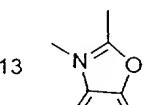
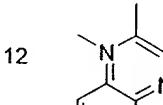
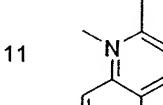
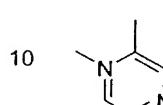


25 wherein N and C are nitrogen and carbon atoms, respectively; A and A' are respectively a cyclic group capable of having a substituent and bonded to the

metal atom M via the carbon atom; B, B' and B" are respectively a cyclic group represented by a formula of (6) - (14) shown below capable of having a substituent and connected to the metal atom M via the 5 nitrogen atom:



10



15

{wherein the substituent is selected from a

halogen atom, a cyano group, a nitro group, a

20 trialkylsilyl group (of which the alkyl groups are

independently a linear or branched alkyl group having

1 to 8 carbon atoms), a linear or branched alkyl group

having 1 to 20 carbon atoms (of which the alkyl group

can include one or non-neighboring two or more

25 methylene groups that can be replaced with -O-, -S-,

-CO-, -CO-O-, -O-CO-, -CH=CH- or -C≡C- and the alkyl

group can include a hydrogen atom that can be replaced

with a fluorine atom), or an aromatic cyclic group capable of having a substituent (of which the substituent is selected from a halogen atom, a cyano group, a nitro group, a linear or branched alkyl group having 1 to 20 carbon atoms (of which the alkyl group can include one or non-neighboring two or more methylene groups that can be replaced with -O-, -S-, -CO-, -CO-O-, -O-CO-, -CH=CH- or -C≡C- and the alkyl group can include a hydrogen atom that can be replaced with a fluorine atom});

A and B, and A' and B' are respectively bonded to each other via a covalent bond;

E and G are independently a linear or branched alkyl group having 1 to 20 carbon atoms (of which the alkyl group can include a hydrogen atom that can be optionally replaced with a fluorine atom), or an aromatic cyclic group capable of having a substituent (of which the substituent is selected from a halogen atom, a cyano group, a nitro group, a trialkylsilyl group (of which the alkyl groups are independently a linear or branched alkyl group having 1 to 8 carbon atoms), a linear or branched alkyl group having 1 to 20 carbon atoms (of which the alkyl group can include one or non-neighboring two or more methylene groups that can be replaced with -O-, -S-, -CO-, -CO-O-, -O-CO-, -CH=CH- or -C≡C- and the alkyl group can include a hydrogen atom that can be replaced

with a fluorine atom)},

J is a hydrogen atom, a halogen atom, a linear or branched alkyl group having 1 to 20 carbon atoms (of which the alkyl group can include a hydrogen atom that can be optionally replaced with a fluorine atom), or an aromatic cyclic group capable of having a substituent {of which the substituent is selected from a halogen atom, a cyano group, a nitro group, a trialkylsilyl group (of which the alkyl groups are independently a linear or branched alkyl group having 1 to 8 carbon atoms), or a linear or branched alkyl group having 1 to 20 carbon atoms (of which the alkyl group can include one or non-neighboring two or more methylene groups that can be replaced with -O-, -S-, -CO-, -CO-O-, -O-CO-, -CH=CH- or -C≡C- and the alkyl group can include a hydrogen atom that can be replaced with a fluorine atom)};

wherein the compound represented by the formula (1) includes at least one cyclic group having 20 a substituent.

2. An organic luminescence device according to Claim 1, comprising: a pair of electrodes each disposed on a substrate, and at least one luminescence layer comprising an organic compound disposed between the electrodes; wherein the luminescence layer comprises a non-luminescent first organic compound and

a phosphorescent second organic compound represented by the above-mentioned formula (1), and the second organic compound is present at a concentration in the luminescence layer that is higher than a concentration  
5 at which an cyclic group represented by the formula (1) but containing no substituent in any of the cyclic groups A and A' or the cyclic groups B and B' exhibits a maximum luminescence characteristic.

10       3. An organic luminescence device according to Claim 1, comprising: a pair of electrodes each disposed on a substrate, and at least one luminescence layer comprising an organic compound disposed between the electrodes; wherein the luminescence layer  
15 comprises a non-luminescent first organic compound and a phosphorescent second organic compound represented by the above-mentioned formula (1), and the second organic compound is present at a prescribed concentration of at least 8 wt. % in the luminescence  
20 layer providing a maximum luminescence characteristic.

4. An organic luminescence device according to Claim 1, wherein the partial structure  $ML'_n$  in the formula (1) is represented by the formula (3).

25       5. An organic luminescence device according to Claim 1, wherein the partial structure  $ML'_n$  in the

formula (1) is represented by the formula (4).

6. An organic luminescence device according to  
Claim 1, wherein the partial structure  $ML'_n$  in the  
5 formula (1) is represented by the formula (5).

7. An organic luminescence device according to  
Claim 1, wherein n in the formula (1) is 0.

10 8. An organic luminescence device according to  
Claim 1, wherein the substituent of the compound of  
the formula (1) is fluorine.

15 9. An organic luminescence device according to  
Claim 1, wherein the substituent of the compound of  
the formula (1) is a trifluoromethyl group.

20 10. An organic luminescence device according to  
Claim 1, wherein the substituent of the compound of  
the formula (1) is an alkyl group.

11. An organic luminescence device according to  
Claim 2, wherein said maximum luminescence  
characteristic is a maximum luminescence luminance.

25

12. An organic luminescence device according to  
Claim 2, wherein said maximum luminescence

characteristic is a maximum current.

13. An organic luminescence device according to  
Claim 2, wherein said maximum luminescence  
5 characteristic is an external luminescence efficiency.

14. An organic luminescence device according to  
Claim 2, wherein said maximum luminescence  
characteristic is a ratio of luminescence flux/power  
10 consumption obtained by dividing a luminescence flux  
by a power consumption.

15. An organic luminescence device according to  
Claim 1, wherein phosphorescence is emitted from the  
15 luminescence layer by applying a voltage between the  
electrodes.

16. A picture display apparatus, comprising an  
organic luminescence device according to Claim 1, and  
20 a drive circuit for supplying display data.